

Idaho Currents



Transpired solar collectors save energy

Solar panels that heat water or produce electricity have been helping conserve energy for years. Now a third, less well-known type of solar energy equipment can help heat and cool commercial and industrial buildings.

Transpired collectors use solar energy to preheat (outdoor) air as it's drawn into a building. The technology is ideally suited for buildings with at least moderate ventilation requirements in sunny locations with long heating seasons.

The transpired collector is a flat, dark-colored, vertical, perforated metal outside wall that uses solar energy to warm outdoor ventilation air.

The system was developed in Canada by Conservall Systems, Inc., a private solar heating and energy conservation company. The technology was patented under the name Solarwall® in 1989 and tested on various buildings at Ford, General Motors and McDonnell Douglas plants in Canada. The system is now available from a manufacturing plant in Buffalo, New York.

The collector panel can be retrofitted to any non-combustible south-facing wall of an existing building, such as a school, warehouse or factory. It leaves about 6 inches of air space between the metal cladding and the structural wall. Retrofitting is more expensive than making the Solarwall® the southern exposure of a new building, but the technology works the same way for both.

How it works

The dark metal panel captures about 60 percent to 75 percent of the solar energy available and converts it

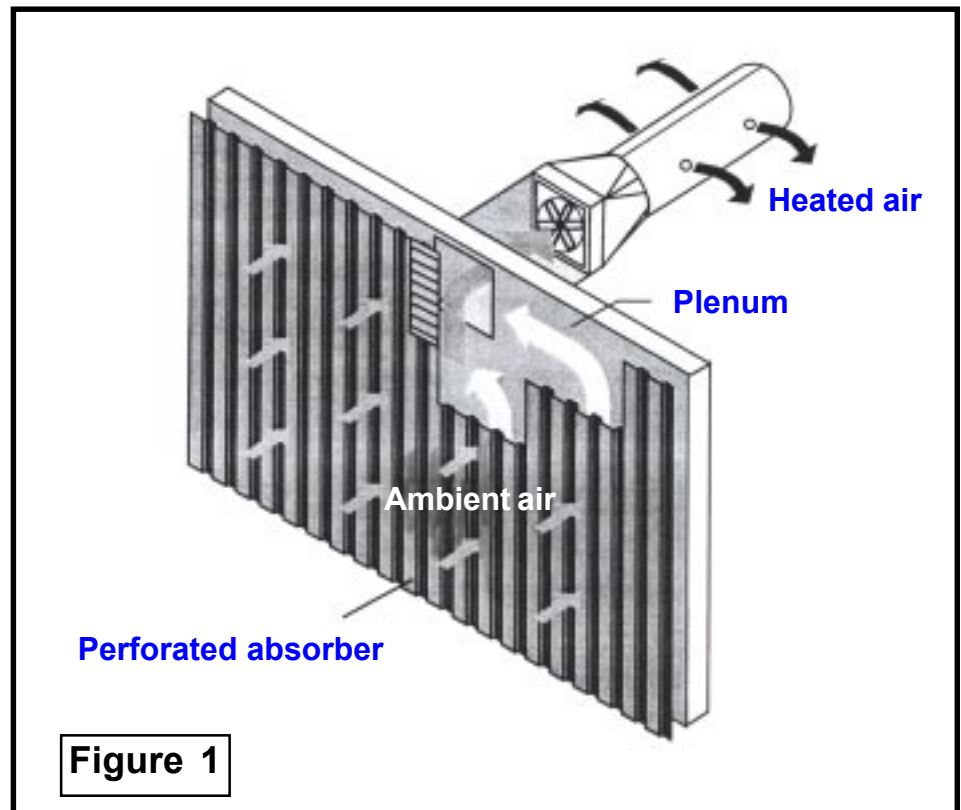


Figure 1

to heat. Small fans atop the panel pull the outside air through the slits or perforations, pre-heating it.

This warmed air rises and is collected and circulated throughout the building through air ducts. The transpired collector also recovers heat that is normally lost from a building and returns it, along with fresh air, to the ventilation system (see Figure 1).

Use of this simple, proven technology reduces heating costs and saves energy by removing a sizeable load from the building's heating system, according to the U.S. Department of Energy.

A bypass damper in front of the fan opens in the daylight summer hours when pre-warmed air is not needed. The damper can be closed at night to pull in cooler outside air and reduce air conditioning loads.

Performance/costs

The transpired air collector is more efficient, less expensive and better for indoor air quality than previous designs of solar air collectors, which generally relied on glazing to hold in absorbed heat, according to the Federal Energy Management Program (FEMP).

Solar energy absorbed by the dark facade and transferred to the air flowing through it can preheat the intake air by as much as 40 degrees F. Design refinements have boosted – from 60 percent to as much as 80 percent – the amount of available solar radiation (diffused as well as direct sunlight) that the transpired collector can capture.

A report released online by FEMP says, "Energy savings range from \$1 to \$6 per square foot of wall area

See Transpired - page 12

State sees improved water supply in 2002

Spring precipitation can make or break a streamflow forecast, especially in southeastern Idaho. This year while some farmers are seeing a better water supply than they saw a year ago, others are seeing equal to or less than last year.

Reduced snowpack and forecasts for below-normal streamflows have led to emergency drought declarations in Butte, Blaine, Bonneville, Clark, Fremont, Bingham, Custer, Lincoln, Madison and Power counties.

"It doesn't look like there will be very many more counties added to the list," according to Idaho Department of Water Resources Director Karl Dreher. "Eastern Idaho has had a cooler spring and more precipitation this year."

In order to declare a drought in a particular county, the county's board of commissioners files an emergency declaration with IDWR. The director then files a formal request with the governor's office.

As soon as a drought emergency is declared by the governor, water users can work with IDWR to temporarily reallocate water rights and secure temporary water rights to make it through the summer.

As of June 21, the governor's office had declared drought emergencies in 10 counties compared to more than double by the same time last year. By mid-June, 2001, emergency drought declarations were approved in 23 of Idaho's 44 counties.

Low snowpack

The first drought emergency this year was declared by Gov. Dirk

Kempthorne in Butte County on April 23.

"Despite average and above-average snowfall amounts in many of Idaho's mountains, there are concerns about the water outlook for Butte County," Kempthorne said. "The mid-April snowpack in the Big and Little Lost River basins is at 65 percent of average, and the streamflow in the basin is projected to be at 60 percent of average."

Severely restricted water supplies face Bonneville County irrigators. Low carryover storage from 2001 in Jackson Lake and Palisades Reservoir is contributing to a forecast of this year's water supply for the Snake River being the ninth lowest in 50 years.

In Blaine County, the basin-wide snowpack is at 69 percent of average, with estimated runoff available for irrigation at between 45 percent and 55 percent of normal. The streamflow of the Big Wood River in Hailey has been measured at 65 percent of average.

"Irrigators in Custer County are facing severely restricted water supplies for this season," says Kempthorne. "The observed streamflow in the Salmon River at Salmon are slightly above flows last summer, which were the third lowest in the 81 years records have been kept."

For up-to-date on-line drought information, see IDWR's website at www.idwr.state.id.us.



Dry streambeds are a familiar sight in Eastern Idaho this year because of another low-water year throughout the area. By the end of June, the governor's office declared drought emergencies in 10 Eastern Idaho counties. (IDWR photo)

Ada County tracks utility savings through Rebuild Idaho program

By Sue Seifert, Senior Energy Specialist

With electric and natural gas prices rising between 43 and 60 percent during the past 18 months, public agency energy budgets in Idaho are receiving a lot of attention – at least inside the agencies.

In a mid-sized Idaho city, for example, dollars spent due to utility rate increases may approach \$100,000 annually. That can put a significant crimp in a budget. Perhaps more alarming, a school district in the same city could easily see its energy budget increase by three times that amount.

Rural Idaho school districts maintain significantly more square footage than rural city or county

buildings, and many times the districts provide a larger community service through extended operating hours to host community functions.

Fortunately, during the past few years, even previous to rate increases, energy champions have emerged in many of our communities. These leaders – mayors, county commissioners, superintendents and building managers – have made deliberate efforts to reduce energy expenditures and save community dollars through implementation of good energy efficiency strategies.

But it's the building managers who form the front line in the fight for

budget increases to cover ever-rising utility costs. These are also the same people most frequently in charge of the building and operations budget.

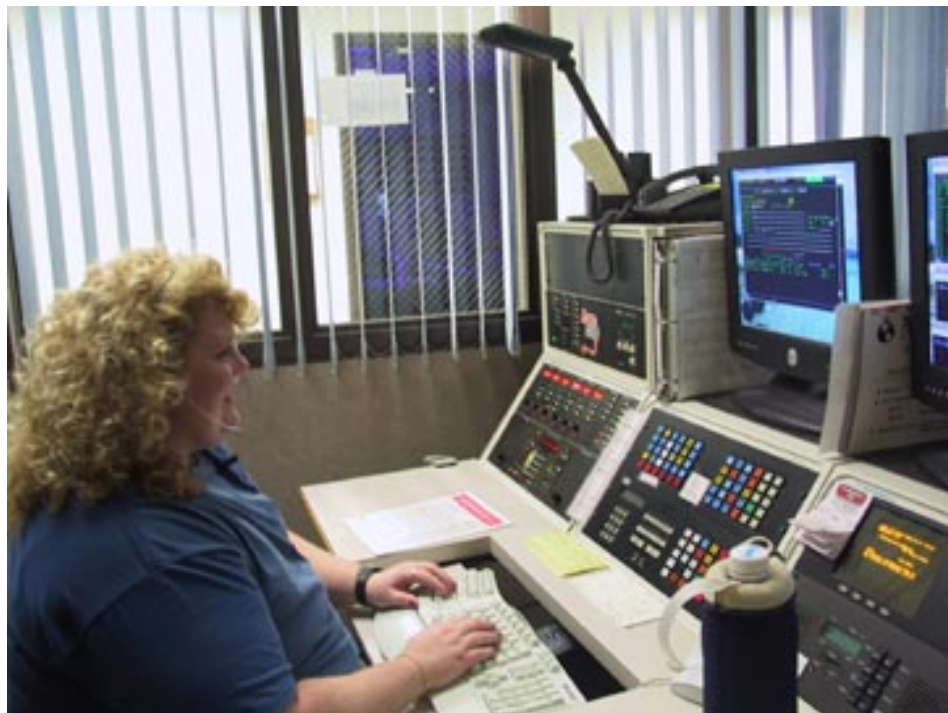
So it should come as no surprise that when given good choices for saving operation dollars through energy efficiency most of them take time to listen. The good building managers go a bit further – they take action.

For example, about two years ago Dave Logan, Ada County operations director, led the county on a journey into energy efficiency with the support and encouragement from the Ada County commissioners. The first step for Ada County was to join the Rebuild Idaho program and consult with the Energy Division staff on development of a five-year plan for county buildings.

The Energy Division's Rebuild Idaho program, funded by the U.S. Department of Energy, has been a strong voice for building energy efficiency for more than four years. During that time partnerships have been formed with over 25 school districts, universities, colleges, cities and counties throughout the state. As part of the program, building personnel have received energy efficiency assistance and training in operation and maintenance.

Rebuild Ada County

One of the first actions of Rebuild Ada County was to gain a better understanding of utility expenditures. County operations



Ada County dispatcher Julie Avery works amid construction on a new heating, venting and air conditioning system at the Ada County Public Safety Building in Boise. With the dispatch center open 24 hours a day, an energy-efficient HVAC system will reduce energy use and save taxpayer dollars. (Photo by Diane Holt)

personnel were trained on the use of utility tracking software provided by Rebuild Idaho.

This software makes it easy to compare past energy use with current use to determine if efficiency measures undertaken are saving energy. The software gives Rebuild Partnerships a way to effectively measure the success of their efforts.

The next steps for the county included implementation of a low-cost operation and maintenance (O&M) program and the decision to build the new 350,000-square-foot courthouse as energy- and resource-efficient as possible.

To pursue this goal, the courthouse was designed and constructed to meet the Idaho Commercial Energy Code, a voluntary standard approved by the American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc. The O&M program included low-cost activities, such as turning out lights in unoccupied spaces and using setback

functions on thermostats to reduce heating and cooling loads after work hours.

The success story

Led by Logan and his operations staff, the county reaped a healthy \$144,000 in low-cost savings between January 2000 and December 2001 by changing the way they operated three building complexes – the public safety, juvenile detention and the Western Idaho Fairgrounds.

Perhaps more dramatic is the energy efficiency observed in the newly built and recently occupied Ada County Courthouse. At more than twice the square footage, the February 2002 energy bill for the new courthouse was almost \$700 less than the combined February 2001 bills for the three buildings it replaced. There was a 56 percent reduction in cost per square foot during the first full month of operation of the new courthouse when compared to the previous year costs.

The keys to success

Paying attention to energy bills can make a difference in the bottom line. Understanding what is currently paid, meter-by-meter, can often motivate people to change perspective about energy solutions in buildings.

But real change takes someone who is willing to focus on needs and work toward positive change. Making a decision to move toward action, and then taking the action, is the real key to energy savings within a community, school district or institution.



On the cover

Prior to the Bioenergy 2002 Conference in September, two Early Bird tours will be conducted. One tour will include a visit to the nation's only geothermally-heated capitol building.

Boise sits atop a large, naturally occurring geothermal resource. The hot water is tapped and pumped from a source 3,000 feet underground. Besides the capitol building, the entire Capitol Mall is heated by this natural aquifer.

The Idaho Capitol, a replica of the U.S. Capitol building in Washington, D.C., was constructed between 1906 and 1920. From the first floor to the tip of the eagle atop the dome, the building rises 208 feet.

The building's total floor area is 201,720 square feet, including four floors and the basement. The corridors, floors, wainscoting and base throughout the building consist of 50,646 square feet of artistically carved marble.

For more information about the Bioenergy 2002 Conference, see pages 6 and 7.



Dave Logan, Ada County operations director, checks an automatic setback thermostat at the Ada County Safety Building. (Photo by Diane Holt)

Bioenergy conference focuses on environment

National and international experts will bring the latest techniques and technologies to Boise in September for Bioenergy 2002 – the 10th Biennial Bioenergy Conference and Trade Show.

The Pacific Regional Biomass Energy Program, one of five regional programs supported by the state energy offices and the U.S. Department of Energy, will host the five-day conference.

“The primary objective of the program is to match local resources to local needs and to encourage the use of biomass energy technologies that are technically feasible and cost-effective,” says John Crockett, energy specialist with the Energy Division. Crockett is co-chairman of Bioenergy 2002 with Dr. Charles Peterson from the University of Idaho.

Bioenergy is the energy derived from the use of biomass materials. Biomass is defined as plant materials and animal waste used as a source of fuel.

The purpose of the bioenergy

conference is to provide a forum to share and develop new ideas that will improve knowledge of bioenergy’s ever-increasing role as an energy resource. Technical sessions will emphasize using biomass to reduce our dependence on fossil fuels and supplement our regional energy resources while benefiting the environment.

Opening events

To get a taste of Idaho and Boise, two separate early bird tours of the city of Boise and Hells Canyon are offered on Sept. 22. Three optional tours will be conducted the final day of the conference on Sept. 26. Tour sites include the Magic Valley, the Treasure Valley, and Micron Technology, Inc.

A welcoming reception the evening of Sept. 22 at the conference site will enable attendees to meet with their colleagues, conference sponsors and speakers in a relaxed setting. The evening will include refreshments and entertainment by the Basque dancers.

Concurrent sessions

All conference meetings and exhibits will be conducted at the Centre on the Grove in the heart of downtown Boise. The conference will begin Sept. 23 at 8:30 a.m. with a plenary session. More than 200 technical papers submitted for the conference will be presented during 2½ days of concurrent sessions.

The conference will also feature a trade show with exhibits from the leading bioenergy experts from around the world. Interactive exhibits and poster sessions will begin the evening of Sept. 22 and continue until mid-day on Sept. 25.

With a high interest in such bioenergy topics as ethanol, biodiesel, and anaerobic digestion, the conference will feature a free citizens’ night on Sept. 23. The public will have an opportunity to meet with bioenergy experts from around the world and observe the exhibits and poster sessions.

Registration

Pre-registration is highly recommended to ensure meals and proceedings. Registration fees include admission to all sessions, trade show, planned meals and receptions, and the proceedings on CD-ROM. Field trips are extra depending on the destination. A complete registration form is available on page 11 of this issue. For multiple registrations, please make copies of the form.

For more information about the conference, see the Bioenergy 2002 website at www.bioenergy2002.org or contact Crockett at 208-327-7962.



The scenic beauty of Bogus Basin, just 16 miles from Boise, will be the setting for a western barbecue dinner the second night of the bioenergy conference. The popular ski resort receives an average of 250 inches of snow during the winter. During the warmer months the area is a favorite hiking and picnic destination. (Photo provided by Bogus Basin)

Bioenergy 2002 tours showcase Idaho's natural resources

Although Idaho is known for its famous potatoes, the state's scenery and resources are just as impressive. Guests attending the Bioenergy 2002 conference will have the opportunity to experience the state's beauty and natural resources first hand during two early bird and three post conference field trips and a Western barbecue.

The city of Boise tour on Sept. 22 will stop at such locations as the Idaho State Capitol Building. The building, constructed between 1906 and 1920 as a smaller version of the nation's capitol, is the only statehouse in the country to be heated by geothermal water.

Following the statehouse visit, a trolley will take guests to the original Idaho penitentiary. The trip down Warm Springs Avenue will pass by several historical homes that are also heated by naturally occurring hot water. Built in 1870 and used until 1973, the Old Penitentiary features a large, well-kept rose garden, a stark contrast to the high walls and cellblocks.

Guests will tour the penitentiary, followed by lunch at the Bishop's House that is adjacent to the Old Pen. The tour will conclude about 2:30 p.m.

The Hells Canyon tour, also on Sept. 22, will take guests to the Snake River where it flows through Hells Canyon, the deepest gorge in North America bordered by Idaho's Seven Devils Mountains towering on one side and Oregon's Wallowas on the other side.

Within the canyon three hydroelectric plants, authorized for construction in 1955, comprise two-thirds of Idaho Power Company's total hydroelectric generating capacity. Hells Canyon Dam, the third and last plant on the river, began generating electricity in 1967.



Bioenergy 2002 guests will jet boat through Hells Canyon during one of two "Early Bird" tours prior to the conference. Guests will enjoy the majestic mountains, breathtaking white water and an abundance of wildlife during the tour. (Photo provided by Hells Canyon Adventures)

New ENERGY STAR® program certifies energy-efficient homes

Comfort and energy efficiency are becoming increasingly important when shopping for a new home. A new program sponsored by the federal government and launched recently by the Energy Division makes it easier to find or build a high performance home.

Consumers have been purchasing ENERGY STAR® products for the past 10 years. By seeing the ENERGY STAR label, consumers know these energy-efficient products were constructed according to U.S. Environmental Protection Agency and U.S. Department of Energy standards.

The first products included computers and monitors in 1992, followed by printers and then fax machines. Since 2001 many home and office appliances and building products have been available with the ENERGY STAR label, including siding, insulation and windows.

Now the program has evolved to include certification of an entire home as ENERGY STAR compliant. Each home, built to ENERGY STAR specifications, is backed by a national certification that ensures high standards of comfort, safety, durability and energy efficiency. The new standards replace Idaho's GemStar standards.

ENERGY STAR standards are equal to the top tier of GemStar's energy-efficiency specifications, according to Anne Brink, an energy specialist with the Energy Division and ENERGY STAR program manager.

ENERGY STAR homes are at least 30 percent more efficient than Idaho homes built to current standards. This can result in substantial savings in utility costs over the life of the home.

Five main characteristics are found in ENERGY STAR homes:

- Tight construction – reduces drafts, moisture, dust, pests and pollen;
- Tight ducts – improves indoor air quality and comfort;
- Improved insulation – blankets the home in comfort and quiet;
- High performance windows – keeps heat inside during the winter and outside during the summer;
- Energy-efficient heating equipment – reduces utility bills and noise while increasing durability.

As part of the program, specialists trained by the Energy Division are involved in the home building process. They work with subcontractors to guide them in the specified techniques for sealing, insulating, heating and cooling. Periodic inspections are conducted during construction, followed by overall tests. Only after the efficiency has been verified can the builder label the home as ENERGY STAR compliant.

"The Idaho ENERGY STAR certification now lets consumers identify those new homes that meet the same high performance standards used to measure all other types of ENERGY STAR products such as appliances, windows and insulation," says Brink.

For more information on the Idaho ENERGY STAR program, contact Brink at the Energy Division, 208-327-7976. Information is also available on the program's web site: www.idahoenergystar.com.



Tight ducts



Tight construction



High performance windows



Improved insulation

Web site provides info for home energy upgrades

If you're happy with your present home, but want to make it as efficient as the new ENERGY STAR® homes, help is just as close as your computer.

ENERGY STAR's "Home Improvement Toolbox" allows you to learn about your home's energy use and compare it to other homes. You can submit detailed information about your home and receive a customized package of energy-saving upgrades.

By using the web site's "Home Doctor" you can find energy-saving "prescriptions" for common household problems, such as mold and mildew, drafty rooms, cold floors, and icy windows. If you're planning to remodel your home, it will make energy-efficient recommendations.

Kitchen upgrades

As an example, did you know that 20 percent to 40 percent of your total energy costs could be from kitchen appliances and lights? To save money and energy year after year in your kitchen you can install ENERGY STAR labeled appliances such as refrigerators, dishwashers, and clothes washers and dryers.

You can replace your lights with energy-efficient compact fluorescent bulbs that will last longer and use up to 75 percent less energy to provide the same amount of light.

If your remodeling plans include opening walls, you could improve your comfort and energy efficiency by adding insulation and air sealing. If you are replacing the windows and doors, install those with the ENERGY STAR label to keep the room warmer in the winter and cooler in the summer.

To find the Home Improvement Toolbox, the web site is www.epa.gov/hhiptool. Follow the four different icons on the right side of the page.

Home certification

Just as a home performance specialist certifies a newly built home as an ENERGY STAR home, so can a specialist certify that an existing home is an ENERGY STAR home. The same test are used on both homes.

Why go through this certification process? Not only is an ENERGY STAR home more comfortable and energy efficient, but it also has the potential to increase in value. By working with the specialist before, during and after the remodel, the job can be done according to ENERGY STAR specifications.

To view an online list of home performance



Each home must pass a blower door test in order to qualify as ENERGY STAR compliant. The test checks the home for air leakage. Other tests check for air leakage in the ducts and back drafting of gas appliances. (IDWR photo)

specialists see the following website: www.gemstarratings.com/HomePerfSpecialists.htm or call the Idaho Energy Hotline, 1-800-334-SAVE, for a printed list.

Bioenergy - from page 7

Below the dam is a 34-mile wild and scenic section of the river. After touring the power plant, a jet boat will take guests down the river to ride Granite and Wild Sheep rapids. Lunch will be served on the riverbanks prior to returning to Boise. The tour will conclude about 5:30 p.m.

Post-conference tours

The first of three tours on Sept. 26 will take visitors to the **Magic Valley** where nearly a century ago the desert bloomed "like magic." After a series of dams and canals were built in the early 1900s to divert water, this area became the center of Idaho's agricultural region.

Now the area ranks among the top 10 in the production of 18 crops nationally. It is also home to the sixth largest dairy industry in the nation and is the largest producer of trout.

In the Snake River Canyon on U.S. Highway 30 near Hagerman many natural springs gush from the canyon walls and cascade into the river below. The water source, the Snake River Plains Aquifer, is one of the largest groundwater systems in the world. Water flows through several thousand

square miles under southern Idaho's porous volcanic rock before emerging as water falls.

Guests will have the opportunity to visit a 5,000-head dairy and tour the Thousand Springs area, including a fish farm and hatchery and the nearby hydroelectric facility. After a lunch at Thousand Springs, guests will tour an alligator farm. The tour will conclude about 5 p.m.

The Treasure Valley tour will show its guests another aspect of potato use in Idaho – the manufacture of ethanol made from potato waste. Much of the alcohol made at the J.R. Simplot plant in Caldwell is sold as a fuel oxygenate.

The tour will continue to the World Center for Birds of Prey south of Boise. The 7,200-square-foot interpretative center features numerous exhibits about birds of prey, including 200 falcons, condors and eagles that are used for breeding. The center is also the home to the Peregrine Fund. The tour includes lunch at the interpretative center before returning to Boise about 2:45 p.m.

The final tour offered during the conference is to **Micron Technology, Inc.**, in Boise. Micron is one of the world's largest computer chip manufacturers and the largest employer in Idaho. Beginning as a four-man semiconductor design company in 1978, Micron is now an international multi-billion-dollar operation.

Guests will receive lunch and a brief tour of Boise prior to the conclusion of the tour about 1 p.m.

Although the field trips are optional, registration is required by Sept. 13 to ensure ample transportation and meals. All tours will begin at the Conference site on Front Street. Transportation and lunches are included in the tour fees (see registration form on page 11). Only one tour may be selected for each day.

Bioenergy 2002 deadlines

August 21

Cutoff date for guaranteed room rate at the host and participating hotels

August 22

Last day for "Early Bird" registration

September 8

Last day for registration refunds because of cancellation

September 13

Registration for most tours and field trips

September 16

Last day for conference preregistration. Register at the conference after this date.

Pre-registration is highly recommended – meals, proceedings and space are guaranteed to pre-registered participants only.



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Registration Form

The Tenth Biennial Bioenergy Conference Bioenergy 2002 Boise Center on the Grove Boise, Idaho September 22-26, 2002

Send Registration Form with Payment to: Bioenergy 2002, University of Idaho, PO Box 441205, Moscow, ID 83844-1205. For e-mail submittal or for more information contact Chuck Peterson at: peterson@uidaho.edu or (208) 885-7906.

Please print clearly. For multiple attendees, please submit separate registration forms.

(Mr./Ms./Dr.) Name: _____
First name Middle Last name

Title: _____ Organization: _____

Address: _____

City: _____ State: _____ Country: _____ Postal Code: _____

Phone (____) _____ Fax (____) _____ E-mail _____

Special Needs: (____) Vegetarian food: (____) Other: _____

Please check boxes at the right and remit payment with your registration.

Registration fee includes admission to all sessions, trade show, proceedings on CD-ROM, and planned meals and receptions, except the Tuesday Night Barbecue. *Pre-registration is highly recommended as meals, proceedings and space are guaranteed to pre-registered participants only.*

Space for **Optional Field Trips** is limited; some tours have minimum and maximums as well as final registration dates. All of the tours include lunch. Only one tour may be selected each day. One free copy of the **Conference Proceedings** (CD-ROM) is included with the registration fee. Additional copies are available for \$30.

Please check your method of payment. You are not registered until full payment is received.

_____ Check or money order-payable to **Bioenergy 2002**

_____ Credit Card _____ Visa
 _____ MasterCard _____ Discover

Card No. _____

Exp. Date: _____

Signature: _____

A. Registration Fee: <input type="checkbox"/> Early Bird Registration (through Aug. 22) \$350 <input type="checkbox"/> Undergraduate Student (ID required) \$250 <input type="checkbox"/> Regular Registration (after Aug. 22) \$475 <input type="checkbox"/> Regular Undergraduate Student \$375 <input type="checkbox"/> Single Day Registration \$175 _____ Monday _____ Tuesday _____ Wednesday	
B. Tuesday Night Conference Dinner <input type="checkbox"/> Idaho Barbecue – Bogus Basin \$20 <input type="checkbox"/> # of guest(s) _____ x \$20 \$ _____	
C. Optional Field Trips: Sunday <input type="checkbox"/> Tour 1 Boise City (10:30 am – 2:30 pm) \$34 <input type="checkbox"/> Tour 2 Hells Canyon (7:30 am – 5:30 pm) \$79 Thursday <input type="checkbox"/> Tour 3 Magic Valley Tour (7:45 am – 5 pm) \$51 <input type="checkbox"/> Tour 4 Treasure Valley Tour (8 am – 2:45 pm) \$46 <input type="checkbox"/> Tour 5 Micron Tour (8 am – 1 pm) \$39	
D. Additional Conference Proceedings: <input type="checkbox"/> \$30 x _____ (No. of Copies) Total Cost: \$ _____	

Date: _____

Cancellation Policy: Cancellations must be made in writing and submitted by Sept. 8, 2002. A \$50 service charge will be applied to refunds requested before Sept. 8, 2002. After Sept. 8, 2002, **no refunds will be granted.**

Transpired - from page 2

per year, depending on the type of fuel and relative cost. As a retrofit to an existing building, the typical cost of a system is approximately \$10-\$12 per square foot of installed wall.

"In new buildings," according to FEMP, "builders can use lower-cost facades underneath collector walls. Doing so will likely realize savings of \$3 to \$5 a square foot by displacing more expensive facade material. Taking into account this material displacement credit, the installed cost of a collector on a new building is in the range of \$5 to \$7 per square foot.

"About 60 percent of this figure comprises material costs and 40 percent comprises labor, which includes the installation of the collector and the air handling components. Costs will vary for installation depending on location, age of building, wall type, size and access."

Local demonstration

Gerald Whipple of Cedar City, Utah, visited Idaho in February to demonstrate the product to employees at the Energy Division. He said that the system was installed on a communication center at the South Pole and worked so well that part of the wall had to be removed to keep the computers inside from shutting down in the heat. Presently no such systems have been installed in Idaho.

On the windy day Whipple visited Boise, the ambient temperature on the back of the wall in the shade was 28.8 degrees F. The temperature of the air coming through the duct on the back of the wall was 69.4 degrees F and rising as the sun warmed the metal.

Whipple is enthusiastic about the product and feels it can easily produce annual savings of between \$3 and \$5 and perhaps even more per square foot of wall, depending on heating rates and other factors. Obviously, the cheaper the utility rates, the less money will be saved by using a transpired collector. However, it does help improve indoor air quality by bringing in fresh outside air rather than warming re-circulated air.

Whipple lives off-grid and has a transpired solar collector on his shop. He says that any moisture, such as wind-driven rain, that enters the small holes in the vertical wall will exit through bottom weep holes, if it doesn't evaporate in the warm air first. The wall is sealed at the top to prevent rain from entering.

Additional information on transpired collectors is available at two DOE websites: www.eren.doe.gov/femp/prodtech/tranfta1.html or www.eren.doe.gov/solarbuildings.

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